



# GROUND SYSTEMS

## Development and Operations

EXPLORATION BEGINS HERE



## PROGRAM HIGHLIGHTS • JANUARY 2013

At NASA's Kennedy Space Center in Florida, the Ground Systems Development and Operations (GSDO) Program office is leading the center's transformation from a historically government-only launch complex to a spaceport bustling with activity involving government and commercial vehicles alike. GSDO is tasked with developing and using the complex equipment required to safely handle a variety of rockets and spacecraft during assembly, transport and launch. For more information about GSDO accomplishments happening around the center, visit: <http://go.nasa.gov/groundsystems>.



### GSDO Look Ahead for 2013

The Ground Systems Development and Operations (GSDO) program at NASA's Kennedy Space Center in Florida continue to press into 2013 with planned upgrades at the Vehicle Assembly Building (VAB) including improvements to the 175-ton crane, the completion of High Bay 3 platforms design and the awarding of the Firex pumping and piping systems upgrade project.

These projects will prepare the VAB to support a variety of launch vehicle and spacecraft processing scenarios, including NASA's Space Launch System (SLS) and Orion spacecraft.

In addition to the flurry of activities at the VAB, the GSDO program will develop a new command and control system for use at Launch Pad 39B and in Firing Room 1, known as the Young-Crippen Firing Room, in the Launch Control Center. GSDO also will continue a concept development study for an emergency egress system for pad B.

In 2012, the 90 percent design review was completed on the jacking, elevation and leveling (JEL) system of

crawler-transporter 2 (CT2). The fabricated JEL cylinders will be delivered to Kennedy in October. This year's CT2 work also will include fabrication, delivery and installation of the roller bearing assemblies.

Work has begun to recondition the crawlerway from the VAB out to pads A and B and will continue through summer 2014.

This year, assembly, integration and checkout will be completed on NASA's Exploration Flight Test-1 (EFT-1) Orion crew module in the Operations and Checkout Building high bay and it will then be transported to Astrotech in Titusville for fuel servicing. EFT-1 will be launched on a United Launch Alliance Delta IV rocket in 2014. During the test flight, GSDO will recover the module after it splashes down in the Pacific Ocean.

The program's System Requirements Review/System Definition Review was completed in 2012 and helped establish the groundwork needed to launch NASA's Orion spacecraft atop the SLS. Now the work will shift to the Preliminary Design Review to support Orion and the SLS.



## Labs Help Orion Move Toward Milestones

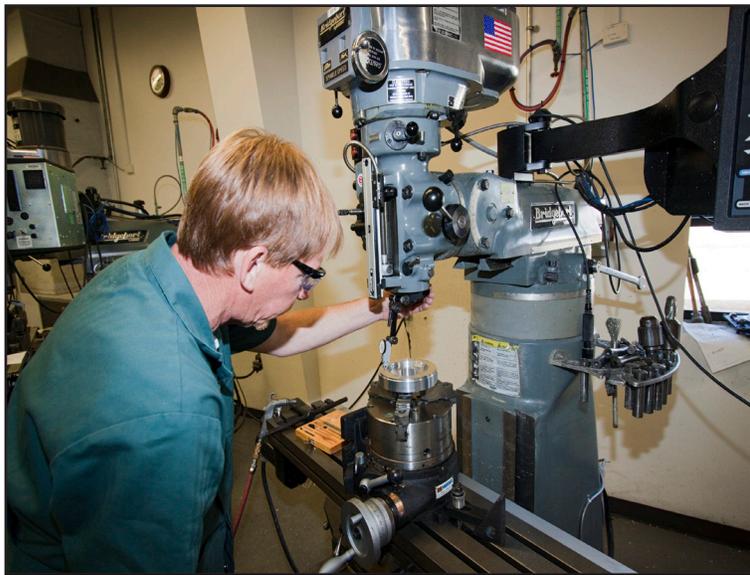
At several laboratories inside the Operations and Checkout Building, NASA employees and Lockheed Martin contractors are working side by side for a common goal: preparing the agency's Orion spacecraft for its first launch, Exploration Flight Test-1 (EFT-1) in 2014.

Colocating contractors on-site provides the advantage of having center personnel and facilities readily available. Because of this cooperative effort, the Orion team is achieving its milestones for assembly and checkout of the spacecraft ahead of schedule.

Upcoming milestones will include testing the structure of the crew module, powering up the vehicle for the first time, completing the assembly and subsystem installations on the crew module, service module and launch abort system, and finally, joining the crew and service modules together.

The materials and processing division possesses numerous capabilities that provide unique solutions to unusual or urgent problems that arise during space preparation.

For the complete story, visit: [http://www.nasa.gov/exploration/systems/mpcv/orion\\_Eftprep.html](http://www.nasa.gov/exploration/systems/mpcv/orion_Eftprep.html)



## New Procedures Developed for Orion Recovery Operations

At first glance, recovery operations of NASA's Orion spacecraft look much like the efforts used to recover its Apollo predecessor. However, many design and technological upgrades have been added to the new spacecraft by teams at the Kennedy and Johnson Space Centers. NASA also is partnering with the U.S. Navy to develop procedures to recover the Orion capsule and crew after splashdown.

All of Orion's subsystems and components created around the country come together in the Operations and Checkout Building at Kennedy. The unique benefit of this

complete on-site operation enables the team to efficiently build the spacecraft, move it directly onto the launch vehicle and then out to the launch pad. Conducting all these operations in one location saves the government transportation costs associated with tests and checkout prior to launch.

The first key Orion recovery test, scheduled for August 2013, will take place at Naval Station Norfolk, in Virginia. The second major test is planned for January 2014 at Navy Base San Diego. The tests are part of preparations for the first flight of Orion, Exploration Flight Test-1 (EFT-1), in September 2014.

For the complete story, visit: [http://www.nasa.gov/exploration/systems/ground/orion\\_recovery.html](http://www.nasa.gov/exploration/systems/ground/orion_recovery.html)



## Employee Spotlight Kirk Lougheed

Title: Integrated Product Team manager for the command, control, communications and range systems (C3R IPT)  
Years at Kennedy: 31

Current Work: Lougheed and his team are responsible for the development, operation and sustainment of the End-to-End Command and Control, Advanced Ground System Maintenance technologies, Communication Services and Range System element integration teams.

Quotable: "I enjoy my current role as C3R IPT lead, as it allows me to see first-hand that our integration efforts have the potential to make a big difference in how everything comes together."

Special Memory: "I met Neil Armstrong when he was touring the firing rooms in the Launch Control Center last May."

Hobbies/Interests: Music (classical/jazz/alternative), photography and cooking, with an emphasis on Indian and Italian cuisines.

